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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,294	07/12/2001	F. William Hersman	09815/47779	2066

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EXAMINER
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WONG, EDNA

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/904,294

Applicant(s)

HERSMAN ET AL.

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 13-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 11 and 12 is/are rejected.
- 7) ☒ Claim(s) 7-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/22/04 & 4/29/04.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date 10/1/04.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims **1-12**, drawn to a polarizing process, classified in class 204, subclass 155.
- II. Claims **13-22**, drawn to a polarizing cell and a polarizing apparatus, classified in class 422, subclass 186.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another materially different apparatus such as the apparatus disclosed by **Ryan et al.** (US Patent No. 5,934,103).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Paul C. Remus on September 30, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims **1-12**. Affirmation of this election must be made by applicant in replying to this Office action. Claims **13-22** are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Drawings***

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because they contain handwritten details. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities:

page 1, line 18, the word "Xenon" should be amended to the word -- xenon --.

page 23, "3HE" should be amended to -- 3He --.

page 13, line 12, reference character "36" has been used to designate both the entrance opening and the exit opening. It is unclear what reference character "36" designates.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

Claim 7, 9 and 10 are objected to because of the following informalities:

#### **Claim 7**

line 2, the word "propogated" should be amended to the word -- propagated --.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

Claims **2 and 5** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2

line 3, "the flowing gas" lacks antecedent basis. Is this the same as the flowing gas mixture?

Claim 5

line 4, the phrase "typically 60 torr of nitrogen" is indefinite.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims **1, 4 and 6** are rejected under 35 U.S.C. 102(a) as being anticipated by

**Ryan et al.** (US Patent No. 5,934,103).

Ryan teaches a polarizing process comprising:

(a) moving a flowing mixture of gas, at least containing a polarizable nuclear species **40** (= xenon) and vapor of an alkali metal **36a** (= Rb gas), with a transport velocity that is not negligible when compared with a natural velocity of diffusive transport (*inherent*);

(b) propagating **50a**, **52** laser light **48** in a direction that intersects the flowing gas mixture (Fig. 2);

(c) containing the flowing gas mixture in a polarizing cell **24**;

(d) immersing the polarizing cell in a magnetic field **32** (col. 3, line 38 to col. 4, line 29; and Fig. 2).

The transport velocity of the flowing gas is substantially greater than the natural velocity of diffusive transport (= up-welling of gases) [col. 4, lines 6-13].

The magnetic field **32** is uniform and substantially aligned with the direction of laser light propagation (Fig. 2).

The polarizing cell **24** has a shape with a transverse direction (Fig. 2).

The laser light has an attenuation length (*inherent*).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **2-3 and 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ryan et al.** (US Patent No. 5,934,103) as applied to claims 1, 4 and 6 above.

Ryan is as applied above and incorporated herein.

Ryan does not teach wherein the polarizing cell has a length substantially greater than its transverse dimension, such that the shape of the polarizing cell directs the flowing gas along a direction generally opposite to the direction of laser light.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one skilled in the art would have been motivated to have modified the process of Ryan with wherein the polarizing cell has a length substantially greater than its transverse dimension because the length of the polarizing cell is a result-effective variable and one having ordinary skill in the art has the skill to calculate the length of the polarizing cell that would determine the success of the desired reaction to occur, e.g., the length of the polarizing cell would have determined the length of time the flowing gas mixture spends in a reaction zone where the mixture is exposed to the laser light and magnetic field for polarization, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to such that the shape of the polarizing cell directs the flowing gas along a direction generally opposite to the direction of laser light, the shape of the polarizing cell disclosed by Ryan allows the flowing mixture of gas to freely fill the reaction vessel **24**



throughout its cavity **24a** (Fig. 2). Thus, some of the flowing gas would have been directed along a direction generally opposite to the direction of laser light.

As to wherein the polarizing cell has a length substantially greater than the laser attenuation length, the length of the polarizing cell is a result-effective variable and one having ordinary skill in the art has the skill to calculate the polarizing cell that would determine the success of the desired reaction to occur, e.g., the length of the polarizing cell would have determined the length of time the flowing gas mixture spends in a reaction zone where the mixture is exposed to the laser light and magnetic field for polarization, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

As to thereby causing efficient transfer of polarization from the laser to the alkali metal vapor, even at low operating pressure where most efficient alkali-polarizable nuclear species polarization transfer mechanism dominates, the reason or motivation to modify the reference may often suggest what the inventor has done, but for a different purpose or to solve a different problem. It is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the Applicants. *In re Linter* 458 F 2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F 2d 688, 16 USPQ 2d 1897 (Fed. Cir. 1990), cert. denied, 500 USPQ 904 (1991); *In re Linter* 458 F 2d 1013, 173 USPQ 560 (CCPA 1972); *In re Dillon* 919 F 2d 688, 16 USPQ 2d 1897 (Fed. Cir. 1990), cert. denied, 500 USPQ 904 (1991) and MPEP § 2144.

As to saturating an original gas mixture with the alkali metal vapor to create the flowing gas before the flowing gas enters the polarizing cell, this is well within one having ordinary skill in the art because the transpositioning of varying steps, or varying the details of a process, as by adding a step or splitting one step into two does not avoid obviousness where the processes are substantially identical or equivalent in terms of function, manner and result.

As to wherein the polarizing cell has an operating temperature that is greater than 150°C, thereby allowing faster polarization time constants and higher achievable polarization than existing practice, the temperature is a result-effective variable and one skilled in the art has the skill to calculate the temperature that would determine the success of the desired reaction to occur, i.e., polarizing the flowing gas mixture, absent evidence to the contrary. MPEP § 2141.03 and § 2144.05(b).

***Allowable Subject Matter***

The following is a statement of reasons for the indication of allowable subject matter:

Claim 5 defines over the prior art of record because the prior art does not teach or suggest the process of claim 1 wherein the polarizing cell has an operating gas pressure that is less than two atmospheres but greater than a pressure required to efficiently quench an alkali optical pumping using a combination of at least 2 torr of a

polarizable nuclear species and a minimum pressure of quenching gas, typically 60 torr of nitrogen.

Claims **7, 9 and 10** define over the prior art of record because the prior art does not teach or suggest the process of claim 1 further comprising: condensing the alkali metal vapor from the as mixture in the propagated laser light.

Claim **8** defines over the prior art of record because the prior art does not teach or suggest the process of claim 1 wherein the laser light enters the polarizing cell by passing through a window of the polarizing cell which is at a temperature substantially lower than that of the polarizing cell, thereby reducing attenuation of the laser light in an unpolarized alkali metal vapor layer in contact with the window.

The prior art does not contain any language that teaches or suggests the above. Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a prima facie case of obviousness cannot be established.

Claim 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claims 7, 9 and 10 would be allowable if rewritten to overcome the claim objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base

claim and any intervening claims.

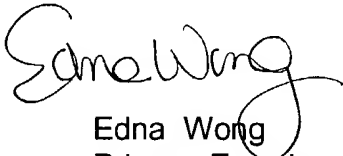
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 3:30 pm, Flex Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Edna Wong  
Primary Examiner  
Art Unit 1753

EW  
October 1, 2004